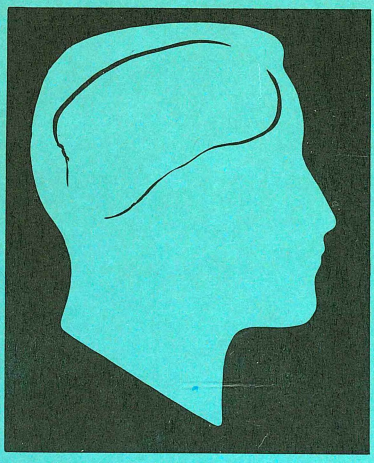
EDU-WARE®



ALGEBRA 1

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ALGEBRA 1 Version 1.1

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ALGEBRA 1 Program and Documentation
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ACKNOWLEDGEMENTS

ALGEBRA 1 was developed exclusively by Edu-Ware Services, Inc., a California software development company dedicated to the production of instructionally valid C.A.I. and intellectually challenging games.

It took the efforts of a number of individuals to bring this product to fruition:

Sherwin Steffin created the basic instructional design which led to the development of the ALGEBRA 1 Programs. He wrote all of the documentation, including the description of the Instructional Model.

David Mullich produced the instructional development leading to the design of concept presentation, coded the programs, and conducted system testing, as well as contributing tremendously to the design of the instructional sequences.

Steven Pederson developed the Edu-Ware high-resolution (upper and lower case) font used throughout these programs, and served as a final system quality control manager.

I. INTRODUCTION

1. What is ALGEBRA 1?

ALGEBRA 1 is a powerful new computer mediated instructional system, designed specifically to help learners gain skills in the use of some fundamental tools applied to beginning concepts in Algebra.

Each of the five diskettes which comprise the complete Algebra system stands as a completely independent module, or unit from the others. As skills are fully mastered in this module, additional units may be purchased.

These goals are achieved through the use of a variety of features:

** Positive reinforcement throughout each program in the module. Correct responses are rewarded by confirmation of the the answer, while incorrect responses eventuate in a display of the appropriate response.

** Provision for cognitive style differentiation allows for, and encourages learner experimentation with "learning styles," which are most attuned to his learning needs.

** Flow charted "information maps" provide the learner an opportunity, at a glance, to perceive the concepts learned, those still to be learned, and those that were troublesome to him. A recommended sequence to follow through the five programs contained in the module is provided.

** Total color high-resolution graphics display, including upper/lower case text for maximum clarity of presentation to learners.

** A system of decremented prompts, designed to increase the learner's self-management of his own learning.

** Program design suitable for both adjunct and stand-alone learning in both home and classroom environments.

** Detailed documentation which describes both the system, and the instructional model upon which it is premised.

2. Quick Entry Usage

If you would prefer to not read the rest of this documentation, and instead go directly to the programs, follow this procedure:

(A) Boot the diskette. You should be reminded that this diskette requires 3.3 DOS to operate. If you have difficulty in booting the disk, consult your DOS Manual for assistance. After a few seconds of disk activity, an Edu-Ware identification will appear on the screen. Next to show is the ALGEBRA 1 identification, followed by the system master Menu.

(B) If the you wish to end the program at any time, all you need do is press the [ESC] key once. As soon as a beep sounds, press the [ESC] key a second time. This returns you to the main Menu. You may exit by pressing the [0] (ZERO KEY) to terminate the program.

3. Using the Documentation

The remainder of this documentation is designed to give you much greater flexibility in the use of these programs, with regard to control over your own learning, and to provide you with an understanding of the program's design.

You also will find some general comments on the care and feeding of your diskettes, which can can get very uncooperative at times. Should a problem occur, be certain to read the Limited Warranty at the end of this material, and follow the directions exactly.

II. THE INSTRUCTIONAL MODEL

Before proceeding with further operating instructions, it seems appropriate to discuss the rationale which has been employed in constructing the instructional model. This model was employed as a basis for the design of each of the five programs. The assumptions on which this model is predicated are as follows:

1. Learning should be managed by the learner.

One of the goals of education most frequently discussed, yet seldom attempted, is self-management by the learner of his personal learning. In the classroom, the teacher prescribes the route by which students will learn. Yet, it seems apparent that, if one is to know how to learn, then he must be given opportunities to discover methods which will be most effective for himself.

To maximize the potentials for self-management, each major concept (program file) is further divided into sub-concepts. For each sub-concept there are four separate ways by which the learner

can gain information:

[A] Definitions

Each sub-concept has a definition by which the learner can learn the terms associated with the particular concept being demonstrated or taught.

[B] Rules

Rules for using each idea presented in the sub-concept are provided when this mode is selected.

[C] Examples

For each idea in the sub-concept, the learner may find as many examples as are necessary for him to learn how to apply the rule or solve a problem using the rule.

[D] Sample Problems

In order to test himself, the learner is presented with 9 problems which test his ability to use the knowledge presented in the other modes. After a response, each answer is "confirmed." This means a "RIGHT" is provided if the answer is correct, and a "WRONG," or a "NO," with the correct answer given, if the response was incorrect. Should the learner not be satisfied with his performance, he can select any of the other modes, and then return to the Problem mode to test himself again.

2. Instruction should proceed in small steps.

Many of those using the ALGEBRA 1 programs are having first-time exposure to the concepts contained within. The authors view it as important that these concepts be presented in very small, discrete steps. Yet, for the learner who has already mastered a concept, there should be no requirement that he repeat this material. Thus, the system is designed to allow exit, and entry at any point, yet maintain information for the learner as to all of the progress he has made, or is yet to make.

3. Reinforcement comes from confirmation.

Many users will find, in programs developed for the young (primary school) learner, reinforcement which uses devices such as graphic smiling faces, the reward of playing a game, or "cute" sound effects. It is the contention of Edu-Ware, that for students above the primary level, such devices are at best worthless, and at worst counter-productive. Such an assertion needs some explanation to develop an understanding of this position.

Almost all would subscribe to the assertion that for learning to occur, there must be some motivation on the part of the learner. This motivation can come from the actions required to learn, or from the perceived value of the newly learned material to the learner.

An example of the former case might well be illustrated by the actions required in learning how to swim. The setting of the beach or swimming pool, the presence of the teacher or the friend teaching the skill are all motivational factors

which make the act of learning attractive. The skill of swimming has itself some intrinsic value. It is an activity from which pleasure can be derived, which is a valuable social tool, and which has usefulness in maintaining the participant's physical health and well being.

Conversely, many learners see little or no value in gaining skills in American history, or English grammar. They are unable to relate these skills to the values they offer, other than the act of demonstrating their learning. For example, if one receives "good grades," then parents are pleased, academic awards may be obtained, and entrance to college is made easier.

Placing the emphasis for reward on the act of learning rather than on the ideas learned, would seem to place the emphasis on an aspect of the task with less value than the task itself.

It is well recognized that two kinds of learning may be identified; acquisition learning and maintenance learning. Acquisition learning is the initial learning of some new behavior or skill, while maintenance learning refers to that learning which is continuing and by which skills are demonstrable after long periods of time have elapsed. An example of acquisition learning is "cramming" for an examination and then forgetting all the material once the exam is completed. An example of maintenance learning, on the other hand, is the skill of riding a bicycle which may be learned in childhood and maintained without practice into the adult years.

Since the skills involved in algebra are skills we wish the learner to maintain and build upon over long periods of time, it seems quite important that it is the maintenance of those

skills which is reinforced and not the simple act of acquiring them. Thus, the reinforcement is directed at long-term skill maintenance, rather than acquisition learning.

4. Program content:

A. Definitions

1. Numerals

2. Operators

a. addition
b. subtraction
c. multiplication
d. division

3. Grouping symbols

a. Parentheses
b. Brackets
c. Braces

4. Equality (less than/greater than)

B. Number line operations

1. The number line

2. Real numbers

a. Positive
b. Negative
c. Real numbers
d. Absolute values

3. Using negative numbers

a. Addition

b. Subtraction
c. Multiplication
d. Division

C. Sets

1. Definition - element/non element

2. Number systems

a. Natural numbers
b. Whole numbers
c. Integers
d. Real numbers

3. Size

a. Null set
b. Finite set
c. Infinite set

4. Properties

a. Equal sets
b. Equivalet sets
c. Subsets
d. Union of sets
e. Intersection of sets

D. Evaluating expressions

1. Variables/constants

2. Factors/coefficients

3. Exponents

E. Rules for equation reduction

1. Combining like terms

2. Simple Equasions

3. Order of operations

III. USE OF THE PROGRAMS

1. General comments

The programs in general have been constructed in order to provide the learner with the maximum flexibility and the greatest ease in acquiring information about his current knowledge, as well as small conceptual steps in the development of new skills.

To aid the learner, the five major programs, as well as the concepts contained within the programs, have been "mapped" with graphic flow charted Menus. On the left side of each menu is the flow chart representation of the choices available from that Menu. On the right side of the Menu is a legend or listing for each of the boxes within the flow chart. The flow chart then represents a recommended sequence for the learner to follow. The choice, however, rests with the learner as to which menu item to select.

These Menus serve a dual purpose. The first use of these Menus is to provide the learner with the recommended sequence. Moreover, in the main Menu, the use of color outlines around each of the rectangular figures in the flow chart provides the learner with additional information. A white outline means that the learner has not as yet attempted that particular program or subprogram. A green outline tells the learner that he has selected that program, and after taking the test problems or the unit test, has demonstrated mastery of the skill being taught in that

particular program segment. Conversely, a red outline is a warning to the learner that he has attempted but has not yet reached mastery of the particular skill in question. A blue outline indicates a recommended unit. Thus, the learner has a continuing color-coded record of how much mastery he has achieved in the programs.

2. Entering the programs

To begin using these programs, follow this procedure:

(a) Boot the disk. This should be done by either inserting the disk directly into the drive and then turning on the power switch at the back of the computer, or if the computer is already on, type PR#6 (6 is the slot which DOS 3.3 has designated for drive use). The diskette will then boot with the Edu-Ware identification appearing on the screen. A few seconds later, the master Menu will appear.

(b) Select any desired program from the master Menu, and press the number key for that program. A few moments later, each of the concepts in the program will appear in a Menu on the screen.

(c) Select the concept you wish to work with at which point a mode Menu will appear on the screen.

(d) Select the mode: definition, rule, example, or sample problem. As soon as you have selected the mode, the first page of the information contained in that mode book will appear on the screen.

(e) On the top of the screen display for each page you will notice the following; in the upper left hand corner three letter/number groups appear. The letters are C, M, and P. The C refers to the concepts which are available on this unit. The M number refers to the mode. One = Definitions; two = Rules; three =

Examples; and four = Sample Problems. The P refers to the page number within that concept and mode. In some cases, there is only one page for a particular mode. In other cases there are multiple pages, just as in a book.

(f) To change modes, do the following: press [ESC] [M] [n] where n = the number of the desired mode you wish to change to. If, on the other hand, you wish to return to the concept Menu press [ESC] [M] [0] (ZERO KEY). This will return you to the concept Menu and will allow you to continue with either your current mode by going into the mode Menu and selecting it again and repeating pages; selecting a new mode, or selecting a new concept within the program. To repeat or return to a page within the mode, do the following: press [ESC] press [M] press [n] where n = the current mode number you are in. This will start the page display from page 1 within that mode.

(g) To leave the programs at any time, press [ESC], wait for the beep, press [ESC]. This will return you to the main system Menu. Then press [0] (ZERO KEY) which will end the program.

IV. ERROR HANDLING

However advanced this computer technology may look, we are still in the dark ages when it comes to reliability of programs and the magnetic media on which they are stored.

For whatever small comfort it may bring, we have installed some error reporting systems that will at least tell you what has gone wrong, and what if anything you, the user, can do to fix the problem.

When problems arise with software, the first thing that comes to mind is that the publisher has made an

error in either the programs, or the preparation of the media. While this assessment can be true, you will want to go through some preliminary tests to determine the cause of the problem before you return your diskette to us for replacement. Follow these procedures if you have any difficulty:

1. NO BOOT

If the diskette will not boot, first check to see that a 3.3 DOS Controller Card is in slot #6 of your computer. This diskette will work only with 3.3 DOS correctly implemented.

Next, while the diskette is attempting to boot, open the disk latch, slide the diskette out, and then back into the drive, reclosing the latch. The "seating," or positioning of the diskette in the drive can often determine whether it will successfully boot. This procedure allows correct placement of the diskette in the drive.

If the problem is not corrected by this procedure, boot a known-to-be-operating diskette in your drive. This will let you determine whether the problem is with the ALGEBRA 1 diskette, or with your disk drive.

2. I/O Errors

Should this error message appear on your screen at any time, it is almost a certain diagnosis of defective media. You should ship the diskette back to us for replacement, should this problem occur.

3. WRITE PROTECT Errors

Since there is some file writing occuring during the use of the programs, do not place a Write Protect tab on the diskette. Should you do this, you will get this error message. Correction is simple - Remove the tab

from the diskette.

4. PROGRAM ERRORS.

While it is not impossible that we have made a programming mistake, it is, quite frankly, unlikely. Our programs undergo quite a rigorous testing and debug protocol before release. Interruption of programs with messages such as SYNTAX ERROR, UNDEFINED STATEMENT ERROR, ILLEGAL QUALITY, or OUT OF RANGE ERROR are likely to be indicative of a change in value in the storage of information on the diskette. Whether or not this is a real program error, or defective media, the diskette should be returned to us for correction, or replacement.

Finally, we extend you an invitation to call us about any difficulties you may experience or any innovative applications you make of these programs. Our number is (213) 346-6783. We look forward to hearing from you.